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U.S. DEPARTMENT OF AGRICULTURE
NATIONAL AGRICULTURAL RESEARCH SERVICE

2005
ARS SCIENCE
HALL OF FAME
Celebrating 20 Years

DECEMBER 7, 2005



A special website is available that features photographs and biographies of all ARS Science Hall of Fame inductees since the inaugural year of 1986. Special features include browse and search functions and video clips from interviews with some members of the Hall of Fame.

Please visit www.ars.usda.gov/careers/hof/

Agricultural Research Service

SCIENCE HALL OF FAME

The ARS Science Hall of Fame was inaugurated in 1986. We determined that each succeeding year, one or more present or former scientists with the Agricultural Research Service could be selected, subject to the following criteria:

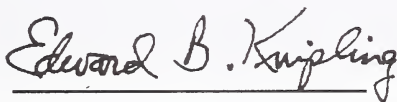
The selectee made widely recognized impact on agricultural research by the solution of a significant agricultural problem through research.

The selectee is a person whose scientific accomplishments and stature continue to affect the agricultural research community and/or influence the development of science-based agricultural policy.

The selectee's character and record of achievement have brought major recognition and credibility to ARS and/or USDA, and are worthy of emulation by younger agricultural scientists.

The selectee's achievements must be or have been nationally and/or internationally recognized by peers in the scientific community.

Today we honor four outstanding scientists by inducting them into the Science Hall of Fame. A plaque citing the achievements of each will be on permanent display in the ARS National Visitor Center at the Beltsville Agricultural Research Center.

A handwritten signature in dark ink, reading "Edward B. Knipping". The signature is written in a cursive style with a horizontal line underneath the name.

Edward B. Knipping
Administrator



SCIENCE HALL OF FAME

Charles W. Beard

Director (Retired)

Southeast Poultry Research Laboratory

Athens, Georgia

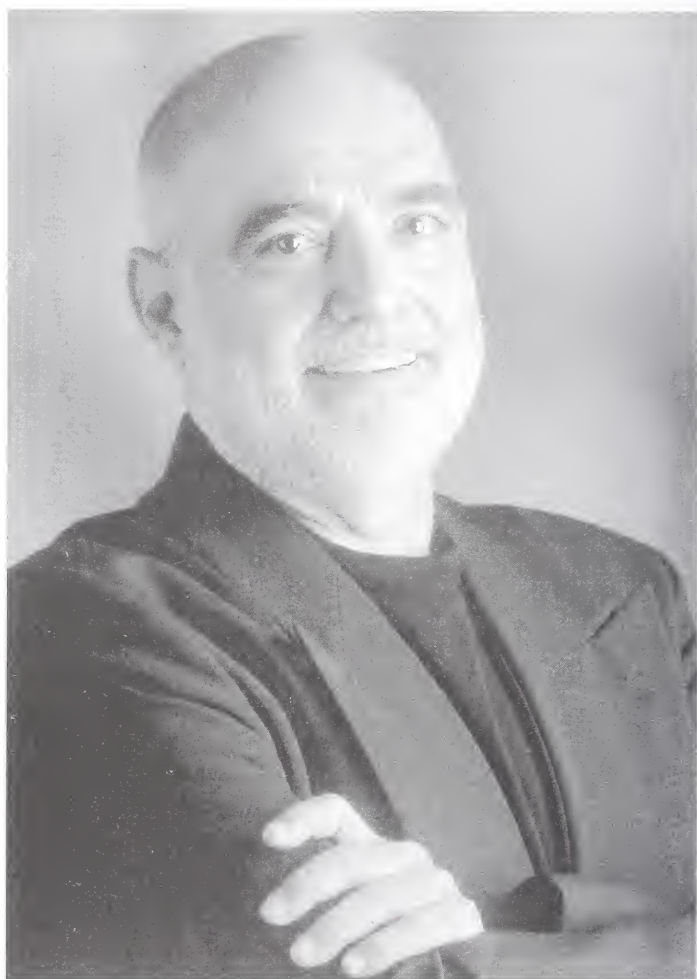
For outstanding contributions in poultry health research, in professional and organizational leadership, and in developing biocontainment concepts and systems for animal agriculture.

Charles Beard's seminal research in exotic poultry diseases continues to benefit the U.S. poultry industry and its exports.

Beard developed the agar gel precipitin test for detection of avian influenza (AI) antibodies in serum and egg yolk. This was the first reliable method for AI testing of poultry flocks for certification as "disease free." The test was widely used during the 1983-84 avian influenza eradication program. It has opened up international trade in poultry products, to the benefit of U.S. producers and their trading partners. The agar gel precipitin test is still used as primary laboratory procedure for monitoring avian influenza in the United States and is the worldwide "gold standard" for avian influenza diagnostics. Beard has also studied a wide variety of poultry disease subjects, including serology, vaccines, pathogenesis, and disease containment. His areas of expertise include avian influenza, newcastle disease, and *Salmonella enteritidis*.

In addition, Beard developed simple containment systems for safely conducting infectious disease research that are the basis of construction standards for biocontainment laboratories.

Beard's honors include the Superior Service Award from USDA, the Excalibur Award for Excellence in Federal Service from Congress, the Lamplighter Award and the Workhorse of the Year Award from the U.S. Poultry and Egg Association, the Poultry Hall of Fame, and the Special Service Award from the American Association of Avian Pathologists. He is a past President of the American Association of Avian Pathologists.



SCIENCE HALL OF FAME

Nelson A. Cox

Microbiologist

Poultry Microbiological Safety Research Unit

Athens, Georgia

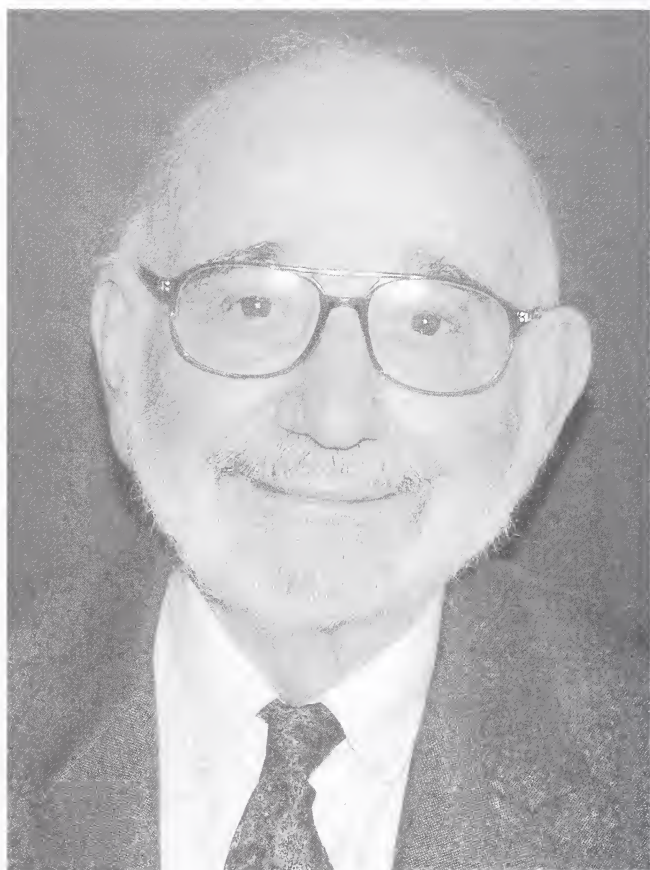
For lifetime contributions of distinctive research benefitting the poultry industry and public health through development and transfer of technologies that reduced foodborne pathogens, particularly Salmonella and Campylobacter.

Nelson Cox is one of the most influential poultry microbiologists in the world today. His work has led to huge reductions in contamination of chicken and massive savings to the poultry industry.

Cox demonstrated that fecally contaminated condemned carcasses are microbiologically indistinguishable from inspection-passed carcasses after reprocessing, convincing Congress to approve the practice. Reprocessing has become standard in the poultry industry, resulting in over \$100 million in savings.

He proved that immersion chilling is superior (in microbiological terms) to air blast chilling, preventing a European trade ban that would have hurt the U.S. poultry industry. He identified hatcheries as reservoirs of *Salmonella* and developed numerous intervention strategies that affect the breeding and hatching operations of every major broiler integrator in the United States and reduced *Salmonella* contamination from 75 percent in 1990 to 11 percent today. Recently, Cox has focused on sources of *Campylobacter* in poultry, of which relatively little is known. He was the first to demonstrate that *Campylobacter* can be transmitted in poultry through the fertile egg, and he was the first to isolate *Campylobacter* from many internal organs and tissues of commercial poultry.

Cox is the recipient of twelve major research awards, and ARS named him Distinguished Senior Scientist of the Year in 2003. He is a Fellow of the American Academy of Microbiology.



SCIENCE HALL OF FAME

Sigmund Schwimmer

Chief Research Chemist (Retired)
Western Regional Research Center
Albany, California

For a distinguished career of scientific excellence in enzymology and its application to food science and human food products and quality.

Sigmund Schwimmer's research on the structure and function of enzymes and their varied and powerful uses in food preparation and preservation has earned him international recognition and transformed the U.S. food industry. His work on low-temperature preservation became the foundation of modern frozen food. His other research led to improved practices in brewing, baking, and distilling and innovative advances in health and nutrition.

As early as World War II, his investigations into the use and accurate assays of enzymes for the production of ethanol as fuel provided indispensable principles for modern production of gasohol from corn.

Schwimmer's research on the reactions of foods to low temperatures revealed effects of temperature fluctuations, degree and nature of quality deterioration by enzymes at low temperatures, benefits of blanching to stabilize quality, and the methodology of freeze-drying.

Other research focused on development of soy products for human consumption, investigation of borderline scurvy, and improvement of foodstuffs through enzymatic methods. He has developed methods for and made many discoveries about metabolic molecular biology related to DNA. His methods are used especially in cancer research.

Schwimmer is a recipient of the Distinguished Service Award from USDA's Bureau of Chemistry and Soils and the Distinguished Service Award from USDA. The National Science Foundation honored him with its Senior Postdoctoral Fellowship Award. He also received the Distinguished Achievement Award of the Food and Agricultural Division of the American Chemical Society and the Guggenheim Foundation Award.



SCIENCE HALL OF FAME

Tien C. Tso

Collaborator (Retired)

Henry A. Wallace Beltsville Agricultural Research Center
Beltsville, Maryland*For outstanding research contributions and leadership in plant physiology and phytochemistry and their use to advance plant science.*

Tien Tso was a leader in laying the foundation of organic metabolism of phytochemistry: the roles of organic compounds and their metabolism in plants, including sugars, organic acids, amino acids, sterols, and polyphenols.

Though his primary research employed the tobacco plant as a model, his accomplishments apply to flowers, fruits, and other plants. Further, much of his work supports medical and nutritional uses of tobacco plant constituents. He studied alkaloids in tobacco and explored the biogenesis of nicotine and nornicotine and their metabolism. He developed a group of fatty acid compounds to control tobacco sucker growth, compounds that are widely used in the fruit and flower industries for thinning purposes.

Tso also made important contributions in mineral nutrition, genetic tumors, and the effects of light on organic compounds, as well as projects in agronomy, plant chemistry, smoke chemistry, and medical science.

Because of the trust and confidence Tso enjoys from the People's Republic of China, he was instrumental in strengthening scientific relations and enhancing trade with the Chinese; for example, his efforts have resulted in millions of dollars of U.S. wheat exports per year.

Tso is a Fellow of the American Association for the Advancement of Science, the American Institute of Chemists, and the Agronomy Society. He is a recipient of USDA's Superior Service Award and Distinguished Service Award, the Presidential Award for Meritorious Service, the Distinguished Scientific Research Award from the Cigar Association, the first CORESTA Prize for distinguished scientific achievements from the International Tobacco Science Organization, and the Lifetime Achievement Award from the Tobacco Science Research Conference. In 1965 he was named to the Presidential Lung Cancer Task Force.

ARS SCIENCE HALL OF FAME

1986

Edward F. Knippling

For pioneering research and leadership in development of the sterile insect technique, which led to the eradication of the screwworm, and of other technologies to suppress and manage insect pests.

1987

Howard L. Bachrach

For pioneering research on the molecular biology of foot-and-mouth disease that led to development of the world's first effective subunit vaccine for any disease of animals or humans through the use of gene splicing.

Myron K. Brakke

For consistent, career-long valuable contributions to the science of virology, particularly plant virology.

Glenn W. Burton

For outstanding achievements in forage and turf science, which have had extraordinary effects on the forage-based cattle industry, the turf industry, and agriculture worldwide.

Wilson A. Reeves

For outstanding research and leadership in the field of textile chemical finishing that have significantly benefited agriculture and consumers.

Earnest R. Sears

For pioneering work in wheat genetics and for discoveries on chromosomal mechanisms that established standards in animal, plant, and human genetics.

Orville A. Vogel

For development of the first useful semidwarf wheats and of innovative production systems that made the Pacific Northwest a major source of soft white wheat, inspired similar research efforts throughout the world, and sparked the Green Revolution.

Cecil H. Wadleigh

For elucidating the mechanisms through which crops respond to salinity and water stress and for inspired planning and leadership that enabled and motivated those who worked with him to expand and make use of knowledge of soils, water, and air and their interactions with plants.

1988

Francis E. Clark

For outstanding research leading to greater understanding of soil, plant, and microbial interactions and of nutrient cycling in terrestrial ecosystems.

Edgar E. Hartwig

For research in soybean breeding and genetics that has been a major factor in soybeans becoming the second most valuable U.S. crop and particularly for developing cultivars that thrive in the South.

Ralph E. Hodgson

For significant contributions to the knowledge of ruminant nutrition and for visionary leadership, both domestic and international, in the animal industries.

Hamish N. Munro

For career-long contributions to the science of nutrition, particularly on the relationship of dietary protein and iron to the health of the elderly, and for promotion of studies on aging.

Jose Vicent-Chandler

For research leading to new and greatly improved production systems for beef, milk, coffee, plantains, and rice for Puerto Rico and Caribbean countries.

1989

Douglas R. Dewey

For world leadership in genetics and taxonomy of the Triticeae tribe of grasses and for development of the cytogenetic basis for creating new grass hybrids.

Theodor O. Diener

For conceptualizing and discovering viroids, for leading research on viroid detection and control, and for inspiring new approaches in the search for causes of several serious diseases affecting plants, livestock, and humans.

Karl H. Norris

For developing principles and instruments using the electromagnetic wave spectrum to make rapid nondestructive measurements for evaluating quality of agricultural products.

John F. Sullivan

For engineering contributions to the food-processing and preservation industries, including development of instant potato flakes and of batch and continuous-explosion puffing.

1990

Theodore C. Byerly

For extraordinary contributions as a scientist, research leader, and administrator to the success of agricultural research programs and advances in U.S. and world agriculture.

Gordon Dickerson

For research contributions widely used by breeders to increase production efficiency of cattle, sheep, swine, and poultry.

Robert W. Holley

For isolation and characterization, including the first nucleotide sequence, of transfer ribonucleic acid (tRNA).

Virgil A. Johnson

For outstanding contributions to development of superior bread wheat cultivars and of improved wheat germplasm and for vigorous promotion of national and international cooperation among wheat breeders.

George F. Sprague

For outstanding contributions to effective methods of hybrid corn breeding and germplasm improvement.

1991

John H. Weinberger

For outstanding lifelong contributions in development of fruit varieties and fruit-breeding technology.

Walter H. Wischmeier

For developing the Universal Soil Loss Equation, which has been widely used for three decades worldwide in conservation and management of our natural resources.

1992

Raymond C. Bushland

For pioneering research leading to screwworm eradication by the sterile insect technique and for research leading to control of typhus vectors.

Lyman B. Crittenden

For significant contributions to retroviral genetics, transgenic animal development, and genome mapping in poultry.

Arnel R. Hallauer

For increasing understanding and use of quantitative genetics in plant breeding, which has led to development of many superior corn hybrids worldwide.

1993

John R. Gorham

For scientific leadership and studies that have resulted in solutions of disease control problems and have advanced the basic knowledge of viral and genetic diseases in humans and animals.

Sterling B. Hendricks

For significant contributions as a chemist, physicist, mathematician, plant physiologist, geologist, and mineralogist.

Clair E. Terrill

For scientific contributions and worldwide leadership in sheep production research.

1994

Charles N. Bollich

In recognition of superlative accomplishments in rice breeding and genetics and their consequent benefits to American agriculture.

Chester G. McWhorter

For outstanding contributions to American agriculture through basic and applied research that has resulted in improved weed-management technology, increased yields, and reduced cost of production.

Malcolm J. Thompson

For career research contributions in the field of insect and plant steroid biochemistry.

1995

Harry Alfred Borthwick

In recognition of contributions in elucidating the importance of photoperiodic mechanisms controlling flowering in plants.

William M. Doane

For initiating, leading, and conducting research that created new and useful products and led to the establishment of new industries based on agricultural raw materials.

Walter Mertz, M.D.

For contributions and leadership in elucidating the importance to health of several trace elements and promoting research on dietary risk factors for chronic disorders.

1996

Fred W. Blaisdell

For pioneering research and development of improved structures for soil and water conservation.

Herbert J. Dutton

For pioneering research leading to the establishment of soybean oil as the predominant edible vegetable oil in the world.

Charles Jackson Hearn

For developing improved orange, grapefruit, and tangerine varieties used extensively by U.S. citrus producers to replace trees killed by the 1980 freezes and to expand the citrus acreage.

1997

Morton Beroza

For major contributions to the development of environmentally compatible insect control strategies through discovery of lures, attractants, repellents, and pheromones.

R. James Cook

For extraordinary research on sustainable approaches to improve wheat health and for leadership in the transfer of information and technology resulting in solutions to agricultural problems.

William L. Ogren

For outstanding leadership and fundamental contributions to photosynthetic carbon metabolism leading to the discovery of new opportunities to improve the efficiency and productivity of crop plants.

1998

Thomas J. Henneberry

For conducting basic and applied individual and team research that has had sustained global impact on development and implementation of integrated pest management systems.

James H. Tumlinson III

For research that led to eradication of the boll weevil from the southeastern United States and the discovery of the chemical basis of plant-insect-parasite interaction.

1999

Allene R. Jeanes

For microbiological, chemical, and engineering research that created urgently needed, life-saving industrial polymers made from agricultural commodities.

Charles W. Stuber

For pioneering the use of molecular markers in identifying, mapping, and manipulating quantitative trait genes.

Richard L. Witter

For outstanding research contributions and leadership in the field of avian tumor viruses.

2000

Virginia H. Holsinger

For research leading to increased use of milk products and for humanitarian efforts in developing nutritious formulations for international food donation programs.

Marvin E. Jensen

For advancements in irrigation scheduling using computer models to estimate soil-water balance and for advancements in evapotranspiration theory.

Harley W. Moon

For contributions to a fundamental understanding of intestinal diseases in livestock and for development of effective control programs for these diseases.

2001

Lawrence A. Johnson

For pioneering research in developing the first useful technology for gender preselection of animal and human offspring and for outstanding contributions to semen preservation and artificial insemination in swine.

William E. Larson

In recognition of a pioneer who respected soil as a natural resource and devoted a research career toward improving its quality.

William L. Mengeling

For outstanding research contributions and leadership in the field of viral diseases of swine.

2002

George Inglett

In recognition of the development of novel, patented food ingredients including Oatrim and Nutrim, which have had a sustained beneficial effect on the American diet.

K. Darwin Murrell

For landmark research on parasites of veterinary and medical importance, especially trichinellosis of swine, and innovative development and leadership of laboratory and agency-level programs that established and advanced objectives of the Agricultural Research Service.

Stuart O. Nelson

For pioneering research on the dielectric properties of agricultural materials, applications of radio-frequency and microwave energy, and electrical measurements for moisture sensing in cereal grains.

2003

Edward B. Bagley

For outstanding research in rheology and food science that generated fundamental understanding of flow mechanics; and for pioneering concepts in super-absorbent materials that resulted in one of the most successful technology transfers in USDA history.

Janice M. Miller

For pioneering research in understanding, diagnosing, and controlling bovine leukemia, transmissible spongiform encephalopathies, and other chronic infectious or zoonotic diseases of ruminants.

2004

Donald K. Barnes

For remarkable contributions to alfalfa breeding and genetics, mentoring of plant breeding students, and service to ARS and the scientific community.

Ruth Rogan Benerito

For applying physical chemistry to solve problems that led to improved procedures and new uses for renewable resources such as cotton, wood, and paper.

Keith E. Gregory

For outstanding research contributions in genetics and breeding of beef cattle and for leadership of ARS research programs.

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